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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of B. GLEICH, et al.	)	Examiner: D. VARGAS
	)	Art Unit: 2859
Serial No.: 10/573,729	)	
	)	Confirmation: 2263
Filed: March 28, 2006	)	
For: **ELECTROACOUSTIC CABLE FOR MAGNETIC RESONANCE APPLICATIONS**	)	
Date of Last Office Action: October 17, 2007	)	
Attorney Docket No.: PHUS030392US/ PKRZ 2 01243	)	Cleveland, OH 44114 April 2, 2008

APPEAL BRIEF

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is an Appeal from the final rejection of October 17, 2007.

The Notice of Appeal was filed February 7, 2008.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I certify that this APPEAL BRIEF in connection with U.S. Serial No 10/573,729 is being filed on the date indicated below by electronic transmission with the United States Patent and Trademark Office via the electronic filing system (EFS-Web).

April 3 2008
Date

Patricia A Heim
Patricia A. Heim

DEPOSIT ACCOUNT

The Patent Office is authorized to charge any fees associated with this filing to our deposit account no. **14-1270**

Tom Lundin
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(i) REAL PARTY IN INTEREST

The Real Party in Interest is the Assignee, KONINKLIJKE PHILIPS ELECTRONICS, N.V.

(ii) RELATED APPEALS AND INTERFERENCES

None

(iii) STATUS OF CLAIMS

Claims 1-14 are pending in the application.

Claims 1-13 stand rejected.

Claim 14 was withdrawn from consideration pursuant to a restriction requirement.

No claims have been cancelled.

Claims 1-13 are on appeal.

(iv) STATUS OF AMENDMENTS

No amendments have been filed since the final rejection. A Request for Reconsideration was filed and the Examiner has responded to that Request for Reconsideration.

(v) SUMMARY CLAIMED SUBJECT MATTER

Claim 1 finds antecedent basis in the disclosed transmission cable 200 for use in a magnetic resonance apparatus (Fig. 1). The transmission cable includes a plurality of cable segments 200n (page 6, lines 26-32) and a plurality of electroacoustic couplers 210 for providing electrical connection between segments (page 2, lines 16-19; page 7, lines 1-3; Figures 3A-3C).

Claim 2 finds antecedent basis in the transmission cable 200 which further includes a first mixer 311 at a first end of the cable for shifting a signal frequency associated with the electroacoustic couplers 210 (page 7, line 27 – page 8, line 7).

Claim 3 finds antecedent basis in the transmission cable 200 which further includes a second mixer 321 disposed at a second end of the cable for shifting a signal frequency associated with the electroacoustic couplers 210 (page 7, line 27 – page 8, line 7).

Claim 4 finds antecedent basis in the transmission cable 200 in which each cable section 200n comprises a first conductor 201 and a second conductor 202 with the first and second conductors connected to at least one electroacoustic coupler 210 (page 7, lines 1-13).

Claim 5 finds antecedent basis in the transmission cable 200 in which each electroacoustic coupler 210 comprises a substrate 220, a first set of conductive fingers 221 disposed on the substrate and a second set of conductive fingers 222 disposed on the substrate such that an acoustic signal is passed from the first set of conductive fingers to the second set of conductive fingers (page 7, lines 6-23; Figures 3A-3C).

Claim 6 finds antecedent basis in a magnetic resonance apparatus which includes a first magnet system 2 for generating a main magnetic field in an examination region 30 (page 4, lines 16-23), an RF coil 10 disposed in the examination region for transmitting and/or receiving RF signals to and/or from the examination region (page 4, lines 24-30; page 5, lines 13-22), and a plurality of transmission cables 200 for carrying signals with the MR system, at least one of the transmission cables including a plurality of cable segments 200n and a plurality of

acoustic couplers 210 for coupling adjacent cable systems (page 2, lines 20-26; page 5, lines 28-36; page 6, lines 1-32; page 7, lines 1-13; Figures 3A-3C).\

Claim 7 finds antecedent basis in the MR apparatus in which the transmission cable 200 includes a first mixer 311 disposed at a first end of the cable 200 for shifting a signal frequency associated with the electroacoustic couplers 210 (page 7, line 27 – page 8, line 7).

Claim 8 finds antecedent basis in the MR apparatus in which the at least one transmission cable 200 further includes a second mixer 321 disposed at a second end of the cable 200 for shifting a signal frequency associated with the electroacoustic couplers 210 (page 7, line 27 – page 8, line 7).

Claim 9 finds antecedent basis in the MR apparatus in which each cable segment comprises a first conductor 201 and a second conductor 202 with each of the first and second conductors being connected to at least one electroacoustic coupler 210 (page 7, lines 1-13).

Claim 10 finds antecedent basis in the apparatus in which each electroacoustic coupler includes a substrate 220, a first set of conductive fingers 221 disposed on the substrate, and a second set of conductive fingers 222 disposed on the substrate or by an acoustic signal is passed from the first set of conductive fingers to the second set of conductive fingers (page 7, lines 7-23; Figures 3A-3C).

Claim 11 finds antecedent basis in the transmission cable 200 for use in a magnetic resonance apparatus (page 6, lines 26-32). The transmission cable 200 includes a plurality of cable segments 200n and a plurality of couplers 210 each of which forms a first signal carried by a first cable segment 200_1 into an acoustic signal and from the acoustic signal into a second signal carried by a second cable segment 200_2 (page 2, lines 27-31; page 6, lines 26-32; page 7, lines 1-23; Figs. 3A-3C).

Claim 12 finds antecedent basis in the transmission cable 200 in which each coupler 210 has a high impedance for a common mode wave on the cable 200 (page 7, lines 11-13).

Claim 13 finds antecedent basis in the cable 200 in which the cable has a first end and a second end and wherein a mixer 311, 312 is in disposed each of the first and second ends for shifting a frequency of a signal transmitted by the cable (page 7, lines 24 – page 8, line 11; Fig. 5).

(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues presented for review are:

whether claims 1 is anticipated by Keilman (US 6,231,516) in the sense of 35 U.S.C. § 102;

whether claim 2 is anticipated by Keilman in the sense of U.S.C. § 102;

whether claim 4 is anticipated by Keilman in the sense of U.S.C. § 102;

whether claim 6 is anticipated by Keilman in the sense of U.S.C. § 102;

whether claim 7 is anticipated by Keilman in the sense of U.S.C. § 102;

whether claim 9 is anticipated by Keilman in the sense of U.S.C. § 102;

whether claim 11 is anticipated by Keilman in the sense of U.S.C. § 102;

whether claim 12 is anticipated by Keilman in the sense of U.S.C. § 102; and

whether claims 3 is obvious over Keilman in the sense of U.S.C. § 103;

whether claim 8 is obvious over Keilman in the sense of U.S.C. § 103;

whether claim 13 is obvious over Keilman in the sense of U.S.C. § 103; and

whether claims 5 is obvious over Keilman in view of Wilk (US 5,908,026) in the sense of U.S.C. § 103; and

whether claim 10 is obvious over Keilman in view of Wilk in the sense of U.S.C. § 103.

(vii) ARGUMENT

A. Claim 1 is Not Anticipated by Keilman

Claim 1 is directed to a transmission cable. A transmission cable or a line is, of course, a system of conductors, such as wires, waveguides, or coaxial cables, suitable for conducting electric power or signals efficiently between two or more terminals. (see for example, McGraw-Hill Dictionary of Scientific and Technical Terms, 6^{th} Ed., 2003). Keilman is not directed to a transmission cable. Rather, Keilman is directed to an instrumented stent which, particularly in the embodiment of Figures 19A-19D are referenced by the Examiner, communicates wirelessly, i.e., without a transmission line or a cable, with a monitoring device external to the body. Thus, Keilman is not analogous prior art in the sense that it does not relate to a transmission cable.

More specifically, Keilman is directed to an implantable medical device, particularly a stent, which carries an IC chip 220 for performing a therapeutic or diagnostic function. Figures 19A-19D referenced by the Examiner illustrate a stent 222 which is a tubular construction which is implanted in a subject and is not interconnected by wires or cable or any other physical structure to the exterior of the patient. Keilman has a series of wires 223, 223A which function as an RF antenna 30 (Figs. 1-6) to receive or transmit RF signals to associated equipment outside of the patient. The RF signals received by the antenna 30, 223, 223A are converted into DC power 32 to provide appropriate power to transducers 44, 46 and other associated circuit elements illustrated in Figures 1-6.

These transducers and their related circuitry, which are powered via the antenna 30, 223, 223A, can perform various monitoring and therapeutic functions such as monitoring pressure, monitoring temperature, and sensing the levels of biochemical substances (col. 3, lines 6-24), capturing or releasing drugs by using magnetic fields to catch or release magnetic delivery vehicles coupled with the drugs, and the like. As the Examiner notes, one of the possible transducers 44, 46 may be an ultrasonic monitor, such as might be used for measuring flow velocity through the stent. Instructions are transmitted to the transducers and the associated circuitry wirelessly, without a transmission cable, via the RF antenna 30, 223, 223A and the

results of the measurements are transmitted wirelessly, without a transmission cable, from the transducers to the associated circuitry outside of the body to transfer the results of any measurements from the transducers. Thus, Keilman is directed to a wireless monitoring or therapeutic delivery device and is not directed to a transmission cable.

The stent 222 and the RF receive/transmit coil, 30, 223, 223A are not connected at either end with either a source of power or data to be transmitted or received. Rather than functioning as a transmission cable, wires 30, 223, 223A function as an RF antenna.

Further, claim 1 calls for a transmission cable for use in a magnetic resonance apparatus. In a magnetic resonance apparatus, large RF pulses are transmitted to excite and manipulate resonance. If a patient has electrically conductive materials in the body, such as an aluminum or stainless steel stent, an implant with antenna wires, or the like, serious problems can occur if that region of the patient is subjected to a magnetic resonance examination. The large RF pulses that are transmitted to excite and manipulate resonance tend to cause large currents in such conductive elements or coils which can lead to significant temperature rises due to resistance heating, or current surges which overpower or destroy electronics associated with an implanted antenna, and the like. It is submitted that the RF antenna 30, 223, 223A of Keilman would render it inappropriate to image the region of the patient with that implanted structure in an MR imagining device, lest the large induced currents in the antenna 30, 223, 233A might burn or injure the patient or create a power surge in the IC components. Accordingly, not only does Keilman not disclose a transmission cable, but Keilman also does not disclose a transmission cable or other device for use in a magnetic resonance apparatus.

Further, claim 1 calls for a plurality of cable segments. Keilman discloses a loop antenna 30, 223, 223A. Keilman does not specifically indicate whether there are a plurality of segments. However, because the antenna wires appear (FIGS. 19A, 19B and others) to have only two ends, which two ends are connected to the IC chip 220, it is submitted that the antenna is a continuous loop and not a plurality of segments.

Claim 1 further calls for a plurality of electroacoustic couplers which provide electrical connections between the plurality of cable segments. First, the RF

coil 30, 223, 223A is not connected directly with the transducers 44, 46. If the antenna 30, 223, 223A of Keilman has multiple segments, such segments are not interconnected by the transducers 44, 46. Rather, the transducers 44, 46 are connected only with intermediate circuitry and are not connected directly to the antenna 30, 223, 223A. The transducers 44, 46 simply do not connect segments of the antenna 30, 223, 223A.

Moreover, claim 21 calls for electroacoustic couplers which provide electroacoustic connection between the segments. While an ultrasonic velocity measurement might be electroacoustic, it is not an electroacoustic coupler. Such an ultrasonic velocity measurement system does not couple, much less provide an electroacoustic connection, between cable sections, much less provide an electroacoustic connection with or between the RF antenna 30, 223, 223A.

Accordingly, it is submitted that claim 1 is not anticipated by Keilman.

B. Claim 2 is Not Anticipated by Keilman

Claim 2 calls for a first mixer disposed at a first end of the cable for shifting a frequency signal associated with the electroacoustic couplers. Keller fails to disclose a mixer or other device which is associated with an end of a transmission cable. Moreover, Keller discloses no device which shifts a signal frequency associated with an electroacoustic coupler, nor does Keller disclose any device connected with a cable which changes the frequency of an ultrasonic transducer 44, 46 of the IC chip 220. Accordingly, it is submitted that claim 2 is not anticipated by Keilman.

C. Claim 3 is Not Obvious Over Keilman

Claim 3 calls for a second mixer disposed at the second end of the cable for shifting a signal frequency associated with the acoustoelectro couplers. Keilman has no second mixer or other structure associated with the second end of a cable. Nor does Keller disclose a second mixer for shifting a signal frequency associated with an electroacoustic coupler. Nor does Keilman disclose a mixer for shifting a frequency of an ultrasonic transducer 44, 46. Nor are multiplexers 50, 68 electroacoustic couplers. Further, an RF amplifier or the frequency of an RF transmitter is not an

electroacoustic coupler and changing the frequency of an RF transmitter would not shift a signal frequency associated with electroacoustic couplers.

Accordingly, it is submitted that Keilman does not place the concepts of claim 3 into the hands of one of ordinary skill in the art.

D. Claim 4 is Not Anticipated by Keilman

Claim 4 calls for each cable segment to include a first conductor and a second conductor which are connected by at least one electroacoustic coupler. Keilman does not disclose cable segments which are connected by an electroacoustic coupler. Connecting the two ends of the antenna wire 223A of Keilman with an IC chip 220 does not disclose or fairly suggest a transmission cable segment which includes first and second conductors connected by an electroacoustic coupler.

Accordingly, it is submitted that claim 4 is not anticipated by Keilman.

E. Claim 5 is Not Obvious Over Keilman as Modified by Wilk

Claim 5 calls for first and second sets of conductive fingers which are disposed on a substrate and for an acoustic signal to be passed between the first and second sets of the acoustic fingers. The Examiner fails to identify any such acoustic transfer fingers in Wilk. The section of Wilk referenced by the Examiner does not set forth the claim structure but rather talks of piezoelectric elements and other structures, but not the claimed substrate and finger sets combination. It is submitted that it is unclear how or why one would try to modify Keilman in light of Wilk and what such modification would hope to achieve. However, since neither Wilk nor Keilman disclose or provide any motivation for a construction which includes two sets of fingers on a substrate between which signals are acoustically passed, it is submitted that there is no motivation to combine Wilk and Keilman and that if one were to combine them, the combination would not yield the construction of claim 5.

F. Claim 6 is Not Anticipated by Keilman

Claim 6 calls for a magnetic resonance apparatus. Keilman does not disclose a magnetic resonance apparatus. Rather, column 38, lines 29-33 of Keilman

referenced by the Examiner suggests that pharmaceuticals which are coupled to a magnetic material can be captured or released using a magnetic field.

Further, claim 6 calls for a first magnet system for generating a main magnetic field in an examination region and for an RF coil disposed in the examination region for transmitting and receiving RF signals from the examination region. The RF coil 223A of Keilman referenced by the Examiner transmits RF signals to and from a remote device, not to and from the interior of the stent.

Claim 6 further calls for a plurality of transmission cables which are an additional structure relative to the RF coil. The Examiner asserts that the RF coil 223A of Keilman somehow is both the RF coil and the transmission coils recited in the claim. To the contrary, it is submitted that claims 3 sets forth the RF coil and the transmission cables as different structures and that such different structures cannot properly be met by a single structure in the reference.

Moreover, the loop antenna 223A is not a transmission cable and does not include a plurality of cable segments and a plurality of electroacoustic couplers for coupling adjacent cable segments. The IC chip 220 of Keilman, which is illustrated in greater detail in Figures 1-4 does not disclose a transmission cable in which adjacent segments are coupled by electroacoustic transducers. The ultrasonic or electrical transducer 44, 46 which is contained within the IC chip 220 of Keilman does not connect adjacent segments of the loop antenna 30, 223A and would not meet this language of claim 6 even if the loop antenna 30, 223A were a transmission cable.

Accordingly, it is submitted that claim 6 is not anticipated by Keilman.

G. Claim 7 is Not Anticipated by Keilman

Claim 7 calls for a first mixer disposed at a first end of the transmission cable for shifting a radio frequency signal associated with electroacoustic couplers. Column 11, lines 5-34 of Keilman referenced by the Examiner relate to radio frequency transmissions between the RF coil and equipment outside of the stent and do not change the frequency associated with acoustoelectric couplers between segments of a transmission cable. Even if one were to consider the ultrasonic transducer 44, 46 of Keilman as an electroacoustic coupler, it does not couple adjacent cable segments and there is no suggestion in Keilman of changing its frequency.

Accordingly, it is submitted that claim 7 is not anticipated by Keilman.

H. Claim 8 is Not Obvious Over Keilman

Claim 8 calls for a second mixer disposed at a second end of the cable. Keilman does not disclose a transmission cable with mixers disposed at first and second ends. The Examiner asserts that having more than one mixer would be a mere duplication of parts and predicates holding of obviousness on this misassumption. To the contrary, claim 8 calls for mixers at first and second ends of the cable which is clearly not a mere duplication of parts.

Accordingly, it is submitted that claim 8 is not rendered obvious by Keilman.

I. Claim 9 is Not Anticipated by Keilman

Claim 9 calls for each cable segment to have two conductors and each of the two conductors to be connected with at least one electroacoustic transducer. Again, the loop antenna 30, 223A is not a transmission cable, does not have segments, does not have segments composed of first and second conductors each of which is connected to an electroacoustic coupler, and does not include electroacoustic couplers.

Accordingly, it is submitted that claim 9 is not anticipated by Keilman.

J. Claim 10 is Not Obvious Over Keilman

Claim 10 calls for each electroacoustic coupler device of the MR apparatus of claim 6 to include a substrate on which first and second sets of conductive fingers are disposed to pass acoustic signals between the sets of conductive fingers. First, it is submitted that the ultrasonic transducer 44, 46 referenced by the Examiner is not an acoustoelectric device which interconnects conductive segments of a transmission line. Further, it is submitted that Keilman does not disclose that the ultrasonic velocity measurement device includes such pairs of sets of conductive fingers. Although Wilk discloses piezoelectric and ultrasonic elements, Wilk again provides no description of sets of fingers disposed on a

substrate, which sets of fingers pass acoustic signals therebetween as part of a transmission line.

Accordingly, it is submitted that the combination of Wilk and Keilman proposed by the Examiner does not disclose the structure of claim 10.

K. Claim 11 is Not Anticipated by Keilman

Claim 11 calls for a transmission cable. Contrary to the Examiner's assertions, the loop antenna 30, 223A is not a transmission cable. Moreover, claim 11 calls for the transmission cable to include a plurality of segments. The loop antenna 30, 223A of Keilman which is connected to the IC chip 220 with only two leads is shown by Keilman as being a single loop and not having a plurality of segments.

Further, claim 11 calls for a plurality of couplers which transform a first signal carried by a first cable segment into an acoustic signal and the acoustic signal into a second signal carried by a second cable segment. The loop antenna 30, 223A of Keilman has no acoustic couplers. The ultrasonic transducer 44, 46 within the IC chip 220 of Keilman does not convert a signal on a first cable segment into an acoustic signal and convert the acoustic signal into a signal transmitted by a second transmission cable segment.

Accordingly, claim 11 is not anticipated by Keilman.

L. Claim 12 is Not Anticipated by Keilman

Claim 12 calls for each acoustic coupler to have a high impedance for a common mode wave on the cable. The Examiner references numerous portions of Keilman, but none relate to a transmission cable with acoustic couplers which evidence a high impedance for a common mode wave on such transmission cable.

Accordingly, it is submitted that claim 12 is not anticipated by Keilman.

M. Claim 13 is Not Obvious Over Keilman

Claim 13 calls for the cable to have a first and second end with a mixer disposed at each of the first and second ends for shifting a frequency of a signal transmitted by the cable. The loop antenna 30, 223A of Keilman is not a transmission cable and does not have a mixer for shifting a frequency of a signal transmitted by the

cable at either end, much less at both ends. Figures 1-6 of Keilman show various circuit elements in the IC chip but do not show or fairly suggest such a pair of mixers for shifting a frequency of a signal transmitted by a transmission cable.

Accordingly, it is submitted that claim 13 is not rendered obvious by Keilman.

CONCLUSION

For the reasons set forth above, it is submitted that no claims are anticipated by Keilman and that all claims distinguish patentably over Keilman or Keilman in view of Wilk. An early reversal of the Examiner's rejections is requested.

Respectfully submitted,

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(viii) CLAIMS APPENDIX

1. A transmission cable, for use in a magnetic resonance apparatus, the transmission cable comprising:

a plurality of cable segments; and

a plurality of electroacoustic couplers for providing electrical connection between segments.

2. A transmission cable as set forth in claim 1 further comprising:

a first mixer disposed at a first end of the cable for shifting a signal frequency associated with the electroacoustic couplers.

3. A transmission cable as set forth in claim 2 further comprising:

a second mixer disposed at a second end of the cable for shifting a signal frequency associated with the electroacoustic couplers.

4. A transmission cable as set forth in claim 1 wherein each cable segment comprises a first conductor and a second conductor and each of the first and second conductors is connected to at least one electroacoustic coupler.

5. A transmission cable as set forth in claim 1 wherein each electroacoustic coupler comprises:

a substrate;

a first set of conductive fingers disposed on the substrate; and

a second set of conductive fingers disposed on the substrate whereby an acoustic signal is passed from the first set of conductive fingers to the second set of conductive fingers.

6. An MR apparatus comprising:

a first magnet system for generating a main magnetic field in an examination region;

an RF coil disposed in the examination region for transmitting and/or receiving RF signals to and/or from the examination region; and

a plurality of transmission cables for carrying signals with the MR system, at least one of the transmission cables comprising a plurality of cable segments and a plurality of electroacoustic couplers for coupling adjacent cable segments.

7. A MR apparatus as set forth in claim 6 wherein the at least one transmission cable further comprises a first mixer disposed at a first end of the cable for shifting a signal frequency associated with the electroacoustic couplers.

8. A MR apparatus as set forth in claim 7 wherein the at least one transmission cable further comprises a second mixer disposed at a second end of the cable for shifting a signal frequency associated with the electroacoustic couplers.

9. A MR apparatus as set forth in claim 6 wherein each cable segment comprises a first conductor and a second conductor and each of the first and second conductors is connected to at least one electroacoustic coupler.

10. (Previously Presented) A MR apparatus as set forth in claim 6 wherein each electroacoustic coupler comprises:

a substrate;

a first set of conductive fingers disposed on the substrate; and

a second set of conductive fingers disposed on the substrate whereby an acoustic signal is passed from the first set of conductive fingers to the second set of conductive fingers.

11. A transmission cable for use in a magnetic resonance apparatus, the transmission cable comprising:

a plurality of cable segments; and

a plurality of couplers each of which transforms a first signal carried by a first cable segment into an acoustic signal and from the acoustic signal into a second signal carried by a second cable segment.

12. A transmission cable as set forth in claim 11 wherein each coupler has a high impedance for a common mode wave on the cable.

13. A transmission cable as set forth in claim 11, wherein the cable has a first end and a second end, wherein a mixer is disposed at each of the first and second ends for shifting a frequency of a signal transmitted by the cable.

(ix) EVIDENCE APPENDIX

None

(x) RELATED PROCEEDINGS APPENDIX

None